SUGGESTIONS

CONCERNING THE

SMALL MONEY

OF THE

UNITED STATES OF AMERICA.

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SUGGESTIONS

CONCERNING THE

Small Money of the United States of America.

Present Condition of United States Small Money.

At the present moment there exist in the United States the following forms of money or currency below the denomination of 25 cents; naming them about in the order of the dates of their emission:

1. A dime, of standard silver, $\frac{9}{10}$ fine, weighing $38\frac{4}{10}$ grains.

2. A half dime, of standard silver, $\frac{9}{10}$ fine, weighing $19\frac{2}{10}$ grains.

3. A cent coin of pure copper, weighing 168 grains.

4. A half cent coin of pure copper, weighing 84 grains.

5. A 3 cent coin, of standard silver, $\frac{9}{10}$ fine, weighing $11\frac{52}{100}$ grains.

All the above are virtually obsolete; the silver coins having been melted or exported, the copper partly withdrawn and replaced by the No. 6, below named, and partly lost.

6. A cent coin, of 88 parts copper, 12 parts nickel, weighing 72 grains.

7, 8, 9. The so-called postage-notes, of the denominations of 10 cents, 5 cents, and 3 cents; these have almost entirely disappeared.

10. A United States note, payable on demand, for 10 cents.

11. A United States note, payable on demand, for 5 cents.

12. A United States note, payable on demand, for 3 cents.

13. A 2 cent coin, 95 parts copper, 4 tin, 1 zinc, weighing 96 grains.

14. A 1 cent coin, 95 parts copper, 4 tin, 1 zinc, weighing 48 grains.

15. A 3 cent coin, 75 parts copper, 25 parts nickel, weighing 30 grains.

16. A 5 cent coin, 75 parts copper, 25 parts nickel, weighing $77\frac{16}{100}$ grains, or 5 grams.

Disregarding those forms which are no longer current in quantity, we still have Nos. 6, 10, 11, 13, 14, 15, and 16, and not a few of No. 3; viz., paper tokens of 10 cents and 5 cents, pure copper coins of 1 cent, copper-nickel-alloy coins (88 to 12) of 1 cent, bronze coins of 2 cents and 1 cent, copper-nickel-alloy coins (75 to 25) of 3 cents and 5 cents.

It will be observed that there is no congruity, or attempt at system, in this medley of small change, or counters; the several pieces of paper or metal being mostly separate and independent creations, having but little relation to each other. Of all the coins, the last made, the 5 cent coin alone, is redeemable by the Government, and even as to that the law is not mandatory.

It is clearly perceptible by this list that there existed before the war a coherent system of silver small coins; which, as we know, fulfilled its function satisfactorily during specie times, disappearing during suspensions of specie payments, requiring to be reduced in weight in 1853, to prevent export, but which was utterly destroyed in the early stages of the rebellion; the copper

cent which accompanied those silver coins, was always a nuisance, but was considered an unavoidable one until the making of the low nickel alloy-coin No. 6, which was a marked improvement.

The substitution of paper tokens for those silver coins was a hard necessity of the times; the fabrication of bronze 1 cent and 2 cent pieces seemed necessary from the scarcity and high price of nickel when they were ordained, but I consider them objectionable, for they have little intrinsic value, and cannot prudently be made redeemable.

The creation of a rich nickel-alloy coin of 3 cents, was the first step towards better things, and by the introduction of a proper material, laid the foundation of a permanent system.

The 5 cent coin of the same alloy is another step in advance, not only because it extends the use of the suitable material, but mainly because in it the principle is at last recognized that small coins should be Government promises to pay, and also because its weight introduces the metrical system, since 77.16 grains equals 5 grams.

It is the object of this treatise to indicate the principles of a proper system of petty coins, and to suggest what seems to the writer the best method of replacing the medley we now have, by such a system as will be permanently efficient in all sorts of times while our Government endures.

General Remarks upon Small Coinage.

Money, in its strict original meaning, is bits of metal, prepared by weighing and stamping for use as a circulating medium for payments, and possessing in-

trinsic value nearly or quite equal to its nominal value.

Mankind have, however, for many ages, made use of various methods for dispensing with the use of coined money in making payments, being compelled to resort to those devices by such valid reasons as the practical impossibility of procuring coins enough, the trouble of transporting and counting, &c., the risk and loss of interest in holding so much intrinsic value, and the absolute loss by abrasion, mislaying and wilful abstraction.

Promissory notes, bills of exchange, bank credits, open accounts, and currency redeemable on demand, may be named as among those devices for dispensing with coined money; all of them, except the last, depending greatly upon the personal character of those who employ them, and being applicable almost exclusively to large transactions.

The innumerable petty transactions in which a small service is to be requited or a small purchase settled, cannot readily be effected without the actual transfer of some object or token, the giving and taking of which end the matter forever; for not only is it troublesome to record and to postpone receipt of small claims, but those who have such small dealings being mostly of the poorer classes, and of somewhat uncertain abode and solvency, would be obliged to pay by higher prices for the risk involved, as well as for the trouble and the delay of postponement. We know in fact that the open account, the store order, or any other substitute for an immediate money payment, usually inflicts a heavy loss upon the poor laborer, who is obliged to resort to it.

A sufficient and suitable low coinage is the proper preventive of those evils, as well as the indispensable means of adjusting to a point the numerous large payments which are effected by coined or paper money, and it is an important duty of Government to provide an abundant quantity of such coinage.

The objects or counters composing that low coinage may, however, have the intrinsic value of their denomination, or they may be a token currency redeemable on demand. A third alternative; that they may be of small intrinsic worth, and yet not redeemable, I think unworthy of consideration.*

Which should they be?

On the one side of this question is the consideration that every holder of such a counter would possess the intrinsic value of the wares or services which he gave for it, and could therefore with certainty obtain for it at any time a similar amount of wares or services.

On the other side are the considerations, that

1. Whenever the material of intrinsically valuable coins becomes, by commercial or financial fluctuations, of more worth in money of account than the denomination of the coins, they are exported or melted, which, in the case of small coins, subjects the community to insufferable inconvenience. They are also liable at all times to withdrawal from circulation by being hoarded.

2. A great loss would be incurred by interest upon the amount of the intrinsically valuable material re-

* Copper coinage generally used to come under this third alternative, but that practice is likely to become obsolete. I find, for instance, the issue value of copper coins in Great Britain, in 1858, to have been rather more than double the value of their material.

quired. Assuming that in any event our 25 cent coin will possess intrinsic value, and that our 1 cent coin will not, and that the United States will need $20,000,000 of counters between 1 cent and 25 cents; this loss of interest to the nation would be annually $1,200,000, less the interest on the cost of a proper substitute, (say $300,000,) showing a net annual loss of $900,000.

3. The loss from abrasion of so great a multitude of small pieces, and from mislaying them, and from punching, &c., would probably reach two per cent. per annum, or $400,000.* (*See note, page* 18.)

Here is surely sufficient reason why intrinsic value is not preferable, provided the one desideratum of absolute acceptability as currency at all times can be otherwise attained. This quality may, however, be perfectly attained by making the counters redeemable by Government—that is, by making them Government promises to pay—and by making them legal tender for a limited amount.

A money token which is quite certain to be redeemed by exchange of intrinsic value for it when required, can perform within its own territory every function of intrinsically valuable money, and the small money of a country is not intended ever to be used for settling international balances; it should, in fact, be of such a nature as to preclude all temptation to send it out of the country, to hoard it, or to convert it to any other use than currency.

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* The danger from counterfeiting is the same with a token coin as with one intrinsically valuable, unless the one material is harder to imitate than the other. In point of fact a rich nickel alloy is harder to imitate than standard silver.

As the total amount of small money required is quite insignificant, compared to the wealth of the country, and as the public will inevitably and always retain in circulation a tolerably uniform and increasing amount of it, it cannot be urged that a low coinage consisting of Government promises to pay would be a burdensome national debt. It might be proper, however, to apply the first profit of issuing such coins to the purchase of national bonds, to be held as a redemption fund, with the proviso that the bonds so bought, and those afterwards bought with the accrued interest, might ultimately be carried to the Sinking Fund, if not required for redeeming small coins. My belief is, that nearly all the difference between the cost price and the denomination or issue value of so many token coins as the convenience of the nation requires, may safely be regarded as a real profit, and that it will merely be necessary for Government to hold itself prepared to meet occasional temporary and partial refluxes of petty coins at those times and places where they are in excess of immediate wants, and that experience will demonstrate the propriety of such an ultimate transfer to the Sinking Fund.

I conceive that all our coins below the denomination of 25 cents should be token coins, not only during these paper money times, but permanently; that they should be made legal tender for all sums below one dollar,* and redeemable by Government at certain designated offices, in legal money of gold, silver, or paper, when presented in sums of not less than one hun-

* The principle involved in this is totally different from that in the vicious old laws of several countries, ordaining that a certain proportion of any debt might be paid in copper coins.

dred dollars; that they should be obtainable at those offices, as well as at the Mint, in exchange for legal money; that the several denominations should all be made of the same material, and should bear the same relation to each other in weight as in denomination; lastly, that the several denominations should be marked by a general similarity of design, and by dissimilarity from the devices and appearance of the more valuable coins. They should be of the finest workmanship.*

The issue of 1 cent and 2 cent bronze coins should of course be stopped at once; also the issue of any paper notes below 25 cents should shortly be discontinued, and even now no more 10 cent notes should be issued, except in exchange for mutilated ones returned. These latter changes cannot be made too soon.

Proper Denominations and Quantity of Small Coins.

It is obvious that experience alone can determine with any exactitude the quantity of small money which any nation should possess. It is also clear that in the case of a redeemable system of small money, the public (who, by having the right of conversion, are able to limit the total issue) will take care that no excess shall exist, while the Government, which makes a large profit upon the coinage, will take care that there shall be no deficiency.

Our own past experience and that of other nations may, however, aid us to form an estimate of the quantity required:

The first point to determine is the range of denomi-

* Chevalier says: "Il faudrait un billon beau comme des médailles pour que le péril de la contrefaçon fût bien écarté."

nations to be embraced in the system. I have already suggested that it should include all coins below 25 cents, (or, in view of the possibility of our making a silver coin of 20 cents to correspond with the European franc, we might say all below 20 cents,) in order to avoid waste of precious metal and the chances of a dearth of small money. Should this view be adopted, we would need token coins of 1 cent, 3 cents, 5 cents, and 10 cents.

Up to the end of the year 1861 our total small coinage had been of—

10 cent pieces, silver	$7,993,535 50
5 " " "	4,336,849 90
3 " " "	1,258,737 00
1 " " nickel alloy	984,660 00
1 and ½ cent pieces, copper	1,601,713 65
Total	$16,175,496 05

This statement of the total amount of small coins existing in the United States about the time of the suspension of specie payments, makes no allowance for the withdrawal of the copper 1 cent and ½ cent, nor for recoinage, loss, or export of the other sorts of coins; deducting on those amounts $2,175,496.05, we have $14,000,000 as the total amount of coins below 25 cents circulating in the United States in specie times, which total was probably made up nearly as follows:

10 cent coins		$7,300,000 00
5 " "		4,000,000 00
3 " "		1,200,000 00
1 cent coins of nickel alloy	$980,000 00	
1 and ½ cent coins of copper	520,000 00	
		1,500,000 00
Total petty currency, January 1, 1862		$14,000,000 00

The small currency outstanding January 1, 1868, was as follows, not counting the remnant of silver coins, which are not likely to enter again into circulation, and omitting fractions:

10 cent United States notes			$7,611,145.00
5 " " " "		2,228,114.00	
5 " nickel alloy coins		2,282,550.00	
			4,510,664.00
3 " " " "		557,940.00	
3 " United States notes		147,555.00	
			705,495.00
2 " bronze coins			792,065.00
1 " " "		1,313,205.00	
1 " nickel alloy coins		1,640,210.00	
		2,953,415.00	
Less nickel cents exchanged, say*		75,556.00	
		2,877,849.00	
1 cent and ½ cent copper, say		250,000.00	
			3,127,849.00
Total,			$16,747,218.00

If from these sums which should be outstanding by the official accounts, (except as to copper, which is estimated,) a fair allowance should be deducted for loss and wear, we would have the following as the amounts now really existing:

10 cent United States notes			$7,000,000.00
5 " " " "		1,800,000.00	
5 " nickel alloy coins		2,200,000.00	
			4,000,000.00
3 " United States notes		70,000.00	
3 " nickel alloy coins		530,000.00	
			600,000.00
2 " bronze coins			750,000.00
1 " " "		1,250,000.00	
1 " old nickel alloy coins		1,350,000.00	
1 " and ½ cent copper coins		250,000.00	
			2,850,000.00
Total petty currency January 1, 1868,			$15,200,000.00

* The Mint has lately begun to take in the old nickel alloy cents in exchange for new nickel coins: this should continue.

If we set the 3 cent and 2 cent counters together against the 3 cent coins of the earlier period, the parallelism in each denomination, except as to the 1 cent coins, is quite striking, and the whole comparison might lead us to imagine that about $15,000,000 is the entire amount of small currency required in this country.

There is, however, at this time, an extremely urgent and constant demand for further quantities of small change, to supply which there is a constant emission of 10 cent notes, and 5 cent, 3 cent, 2 cent, and 1 cent coins; the demand for 5 cent coins being naturally much the greatest, because of the law prohibiting any issue or reissue of 5 cent notes, and because of the large quantities of 1 cent coins and 10 cent notes now out.

When it is considered that the South is almost utterly bare of small currency, that the West is but scantily supplied, and that even the Middle and Northern States have not enough, it can hardly be doubted that a total of at least $20,000,000 of counters below 25 cents would be absorbed as fast as they could conveniently be made, and that the amount required would grow beyond that sum with the growth of the nation. The $20,000,000 presently needed, will probably be divided about thus:

10 cent coins	$8,000,000
5 cent coins	6,000,000
3 and 2 cent coins	2,500,000
1 cent coins	3,500,000
Total	$20,000,000

Comparing our own experience with that of some European countries, we find the following instances:

France, having a population, including Algeria, of

about 40,000,000, proposed to limit the issue of bronze coins (the largest of which is 10 centimes, or 2 cents) to 40,000,000 francs, or $8,000,000, but found that quantity insufficient.*

Belgium, whose population was, in 1856, 4,530,000, had, in 1860, a copper coinage of rather more than $1,000,000 in pieces of 1 cent and under, and on adopting a system of nickel alloy coinage (75 parts copper, 25 parts nickel) in 1860, proposed to issue

Pieces of	20	centimes,	(4 cents,)	4,600,000 francs, say	$900,000
"	10	"	(2 cents,)	2,600,000 "	500,000
"	5	"	(1 cent,)	2,000,000 "	400,000

I have been informed, however, that nearly $4,000,000 were found to be needed and were issued.

Switzerland, whose population was, in 1860, 2,534,000, had issued German-silver coins up to that time as follows:

Pieces of	20	centimes,	2,312,000	francs, say	$460,000
"	10	"	1,331,600	"	260,000
"	5	"	1,001,100	"	200,000
					$920,000

but that quantity was still insufficient.

From such data as these, it has been reckoned in Europe that the maximum of petty coins, not exceeding the denomination of 10 centimes, (say 2 cents,) which

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* The old copper and bell-metal coinage of France, preceding the bronze, was estimated at 40 to 45 million francs.

I have not been able to learn how much copper coin exists in England. The amount issued in 10 years, preceding 1861, was about $2,400,000 in pieces of 1 penny and under. In that year the coinage of bronze began, and has since continued at an irregular rate, the largest amount apparently being about $1,350,000 in 1861.

The proportion of copper coins to gold and silver coins in France, about 20 years ago, was as 2 to 100 in value. In Russia, from 1762 to 1811, that proportion was as 65 to 100.

should be issued, is about 2 francs (say 40 cents,) for each individual composing the nation. Such a rule applied here would give us over $12,000,000 of small coins, not exceeding at the utmost the denomination of 3 cents, which would be twice the amount I have estimated above.

It is certain that the various conditions of compactness of the population, their wealth, the nature of their industries, and their habits, must vary greatly the ratio of petty coins to the number of inhabitants in the several countries of the world, and that each country must decide at last by its own experience what is required for its own convenience in this purely domestic matter.

In our own case, if a suitable system of small coins should be established, convertible at the pleasure of the holder into lawful money of the larger denominations, that system would of course continue unchanged after the resumption of specie payments, and the manufacture of the coins would continue so long as the public demanded them; it would be checked or would cease when they were no longer called for, and would only be resumed at a moderate rate to replace the pieces lost or destroyed, and to satisfy the increase of population.

The denominations needed in this country are 1 cent, 3 cents, 5 cents, and 10 cents; the 2 cent coin is quite unnecessary, and the utility of a 10 cent coin may perhaps be greatly circumscribed by the creation hereafter of a silver 20 cent coin, to correspond with the European franc in a general international assimilation of coinage.

We already have a 5 cent coin of proper material

and weight (viz., 5 grams), and a 3 cent coin of the same material, whose weight should be 3 grams, instead of 30 grains, which it now is. We have a large number of 1 cent coins, none of which are what they should be, and instead of which we should have a 1 cent coin, weighing 1 gram, of the same material as the 5 cent and 3 cent coins just named. Should the 1 cent coin appear small (coins of less than half that weight exist in Europe), it could be made of larger surface by having a hole in the centre.

We have no 10 cent coin, nor could we have one of silver before the resumption of specie payments, since of course no silver coin would be made except in accordance with the entire system of silver coins; it is also very doubtful, to say the least, whether so small a silver coin as 10 cents should ever again be issued. It would seem best, therefore, to authorize the issue of 10 cent coins similar in composition to the 5, 3, and 1, and weighing ten grams.* They would then be put before the public, and if desired, could be furnished, or if not approved or demanded by the public, they could be withheld.

Materials for Small Coins.

A perfect material for small coins should be cheap, handsome, not readily oxidable or alterable by any chemical agency which coins in ordinary use might be exposed to; capable of being readily melted, rolled, punched, stamped, &c., by adequate means, taking a perfect impression of the die, durable in wear, and hard to counterfeit.

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* If specimen coins of this weight should seem too heavy, they might be made smaller.

Of the many metals and alloys known to mankind, very few have qualities to fit them for this use.

Those which have been actually adopted in recent times are as follows, beginning with the least valuable, viz.: 1, pure copper; 2, bronze (*i. e.*, copper, tin, and zinc); 3, German-silver (*i. e.*, copper, nickel, and zinc); 4, a sort of German-silver, containing a little silver in addition to the other ingredients; 5, copper and nickel alloys of several proportions; 6, copper and silver alloy, or low standard silver; 7, silver of ordinary coin standard. Besides these well-known materials, I may name, 8, aluminium, and, 9, aluminium bronze.

Let us review these candidates.

No. 8. Aluminium, is a handsome white metal, of remarkable lightness, (being about one-third the weight of copper,) hard and moderately ductile; coins made of it would be attractive from their beauty and lightness. This metal dissolves with extreme facility in hydrochloric acid, and is even corroded by ordinary salt or pickle. I have seen a dinner-fork of aluminium half eaten away by standing for a short time in a jar of pickles containing salt. Its qualities have not yet procured for it any considerable use in the arts, though its price has been reduced to the comparatively moderate figure of $8 gold per pound.

No. 9. Aluminium Bronze, is a compound of aluminium and copper, in varying proportions. I have specimens in ingots, sheet, and wire, of the three qualities: 5 aluminium, 95 copper; 10 aluminium, 90 copper; 15 aluminium, 85 copper. As the alloy containing 10 parts of the former with 90 parts of the latter metal has been most thoroughly tested and found the most available, for use in the arts and for coins, I will speak

of it only, and will say in a few words that a careful examination of its qualities by the United States Mint proved it to be too rigid for coin material. It was possible to roll it into strips, cut it into planchets, and stamp it into coins; but the difficulties were so great as to make it appear practically unfit for coinage. This remark applies also to No. 8, or pure aluminium.*

It is worthy of remark also, that there is no such quantity of aluminium made anywhere as would be required to supply our coinage. The material, Cryolite, is abundant in Greenland; a considerable quantity of aluminium has been made from it at Newcastle, England, but none has been made in America, nor probably would be without some more certain outlet than to the Mint. Another point is, that since all clay contains a large per centage of aluminium, it is by no means impossible that methods may hereafter be found to extract it at so very low a price as to make it too common for coin material. In any case, its time has not yet come.

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* I am permitted to insert the following notes on aluminium bronze. A specimen bar sent to the Mint by a committee of the National Academy of Sciences, May, 1864.

Mr. Eckfeldt finds the proportion of aluminium by assay to be 9.8 per cent.; evidently meant for 10 per cent.

The specific gravity is 7.63.

The weight of a planchet of same bulk as the legal bronze cent planchet is 40 grains; the bronze weighing 48 grains.

To draw a wire of the aluminium bronze from one-tenth inch diameter down to one-twentieth required 21 draughts and 4 annealings; to reduce a copper wire from one-tenth to one-twentieth required 7 draughts and no annealing after the initial one. Carried in the hand for a few hours, the aluminium bronze becomes quite tarnished. Exposed to a low heat (under cherry red), the al. bronze and the bronze used for coin are about equally oxidized.

The color of aluminium bronze is a handsome orange yellow.

Of the materials hitherto used for low coinage,

No. 1, or pure copper, has, until recently, been the most generally used in almost all countries. It is cheap and easy to work, but is too easily oxidable, rather too soft, and has a disagreeable odor when handled. If coins made of it possess intrinsic value nearly equal to the nominal, they are too bulky for most of the denominations needed; if tokens were made of it, with denominations far above their intrinsic value, they would be counterfeited *ad infinitum*, since copper can be had anywhere, and offers no difficulty in working.

No. 3. German-silver has some good qualities, and has been considerably used for coins in Germany. It is cheap enough, easily worked, and when new is sightly enough; it is, however, rather too soft to wear well, or to offer sufficient difficulty to counterfeiters; it acquires by use a brassy look, unless richer in nickel than the specimens I have seen, and is liable to the objection common to all alloys containing zinc, that the great volatility of that metal at the melting point of copper tends to cause a variable quantity of it to fly off as vapor, leaving the alloy of uncertain and varying composition. The convenience of assay is greatly in favor of binary compositions for coin metal.

No. 4. German-silver containing silver, was adopted in Switzerland because it was thought necessary to add a little silver to satisfy popular prejudice. The example has not been followed in other countries, for the silver thus added is simply wasted.

No. 6. Silver of low standard, viz.: $\frac{3}{4}$ silver, $\frac{1}{4}$ copper, was at first employed in our own 3 cent piece, but after two years experience it was abandoned for

the usual standard silver. The yellowish and paltry appearance of the low standard 3 cent pieces will probably be recollected. It can hardly be doubted that if intrinsic value is to be given, it can best be done with standard silver; if, on the contrary, a token system is preferred, tokens can be made both cheaper and better of other material than low standard silver.

No. 7. Standard silver, is of course too valuable to be used for tokens, and when coins are made of it they are expected to have intrinsic value about equal to their nominal value. As the chief arguments for a token system have already been given, I will only say here that the loss of precious metal by the wear and mislaying of coins, is an absolute loss of so much to the world, and that these causes operate most upon the small coins.* No objection can be urged against silver on the score of fitness for working, of beauty, &c., but economy demands a cheaper and more durable material; and the public convenience demands one which will never be removed from circulation by hoarding, melting or export.

No. 2. Bronze, under this head will be considered only the composition of 95 parts copper, 4 tin, 1 zinc, which has been adopted for the small coins of France, and for the 1 cent and 2 cent coins of the United States.

The copper, tin and lead alloy coined by the Romans five hundred years before our era; the copper, tin and zinc of Roman coins several centuries later

* M. Custer estimates that in Switzerland a new coinage of about $2\frac{1}{4}$ per cent. per annum is required to keep the total of small coins constant.

When the French 15 cent and 30 cent pieces, coined in 1791 and 1792, were demonetized about half a century later, only 16,000,000 were returned out of 25,000,000 issued.

the various alloys of divers proportions of copper and tin used in the arts for statuary, cannon, bells, &c., are all entitled to the name of bronze, but none of them has been found so suitable for coinage as that now used here and in France, viz.: 95 copper, 4 tin, 1 zinc.

As great stress has been laid upon the example of France, it seems proper to review the history of bronze coinage in that country. We find, then, that bronze coins were introduced in France, not as improvement upon copper, but as a make-shift, in the time of the first Republic; for France producing no copper, and being commercially isolated from the rest of the world, was unable to continue the issue of petty coins, except by using as material the bells of churches, convents, &c. When, during the Consulate, France was again able to procure copper, this involuntary coining of bronze was abandoned, and the low coinage was made of pure copper only, until the reign of the present Emperor, who found France flooded with a great variety of copper coins, so diverse in size and appearance, and many of them so shabby, that a change which would replace them all by a new and uniform system seemed necessary, while yet the withdrawal of so great a mass of stuff of little value would entail a very serious sacrifice unless the cheapest presentable substitute were employed. As this necessity does not exist in our case, we are not to follow blindly after France, but to judge the material upon its merits.

It is clear that the objections which apply to copper apply almost equally to bronze. Coins made of it, though clean and of a golden yellow when new, soon acquire by use a disagreeable odor and a valueless appearance. Bronze is moreover so cheap, so easily

made, and so easily worked that it offers no difficulty to counterfeiters; for coins identical in appearance and composition with the genuine ones can be multiplied with very little chance of detection. The bronze coins now in circulation here are perhaps mostly genuine, for metals have been high in price during most of the short time since those coins were emitted, and the great quantity of cents which would have to be passed off to make a large profit would render concealment difficult. It would, however, be the height of imprudence for the Government to issue bronze promises to pay ten cents or five cents, costing not more than one-tenth of their nominal value. Bronze may do for coins to be put out upon the public by the Mint at a large profit, and never redeemed, but it will not do for token coins.

The cheaper material and lighter weight of our bronze cent and two cent pieces were resorted to in those perilous times when our whole future was uncertain, when anything in the shape of coin was greedily demanded, and when cheapness was a first necessity. Our legislators followed willingly the respectable examples of France and England, who for their own reasons had chosen to make bronze coins, (though much heavier than ours,) and the objections which now appear to this material did not receive full consideration.

No. 4. Copper and nickel alloys have been experimented with in proportions varying from 10 nickel, 90 copper, to 50 nickel, 50 copper. The only ones yet used for coins are; 1st, 12 nickel, 88 copper, adopted for our cents in 1857, and displaced for bronze in 1864, because the latter was cheaper and nickel was

hard to get; and 2d, 25 parts nickel, 75 copper, now used in our 5 cent and 3 cent coins, and in the entire petty coin system of Belgium. An alloy of $\frac{1}{3}$ nickel, $\frac{2}{3}$ copper, would be practicable with pure metals and due care in working, and would be handsomer than the alloy of $\frac{1}{4}$ to $\frac{3}{4}$, but to avoid complexity it will not be further described.

The alloy first named is familiar to all, and though far superior to copper or to bronze, is not the best. The alloy of 25 nickel to 75 copper certainly possesses in a marked and hitherto unequalled degree all the properties desirable in a material for token coins. It is cheap enough, handsome, unalterable under all ordinary conditions, durable in wear, and extremely hard to counterfeit. Its hardness is to that of copper as 3 to 2. It is hard to melt, hard to work and to stamp: it yields only to the very best appliances, but yields to them perfectly, making very agreeable, cleanly, and beautiful coins, with sharp impressions of the dies. The skill, the requisite apparatus, and even the material, are practically beyond the reach of counterfeiters, and no imitation of these coins by the use of other metals has ever had the slightest success, either in this country or in Europe. One quality of this alloy, its ring or sonority, has been sacrificed in our 5 cent coins by making them too thick and lumpy.

Nickel is a rather rare metal, occuring mostly in ores of two per cent. or less, which ores are very hard to reduce. It is made extensively in hardly half a dozen places in the world, the second in magnitude of those establishments being in the United States, built up for the service of the Mint, though entirely a private enterprise.

Cost of Making Nickel-Alloy Coins.

This cost consists of the price of the materials and the cost of manufacture. A pamphlet, apparently official, published in Brussels in 1860, and entitled, "*Loi décrétant la fabrication d'une monnaie d'appoint composée de nickel et de cuivre*," which gives at length the discussions and reasons leading to the adoption of a token system of nickel-alloy coins in that country, estimates the cost of nickel at 15 francs per kilogram, or about $1.34 per pound,* and the cost of copper at 3 francs per kilogram, or about 26¾ cents per pound. The cost of manufacture it estimates at 2 francs per kilogram, for pieces of 20, 10 and 5 centimes, or about 18 cents per pound. These prices are of course in gold, and in a land of extremely cheap skilled labor.

In this country, nickel has lately been offered to the Mint at $1.23 gold, per pound, a lower price than was ever known before, and copper can be bought at 16½ cents gold, per pound; equal to currency prices of $1.72 for nickel, and 23 cents for copper. These are both quite below the usual or average prices of those metals and below the cost of production in this country. The fair average prices upon which calculations may safely be based, are about $1.45 gold, (equal to say $2.00 per pound in currency,) for nickel, and 28 cents per pound currency for copper. An adequate supply of nickel could not be counted on

* The price of nickel in England for a number of years has averaged about 4*s.* 6*d.* per pound for the commercial quality of about 95 per cent. purity, and has probably not varied ten per cent. either way from that price in twenty years. The occasional scarcity of nickel has, however, permitted forestallers to run up the price here. The price of $1.45 estimated for the Mint is for absolutely pure nickel of 100 per cent., since the Mint pays only for the real nickel found by its own assay.

even at that price, except for the existence of the domestic supply before alluded to.

Taking those latter prices as the reliable ones, and supposing all the coins to be issued at the rate of 1 gram for 1 cent, as before proposed, we have as the cost of material in 4000 grams, or $40 of coins:

1,000 grams.=2.204 lbs. nickel. @ $2.00 per lb.....	$4.41
3,000 grams.=6.612 lbs. copper, @ 28 cts. per lb....	1.85
	6.26
Add 3½ per cent. for waste in working.....	22
Cost of material in $40 of nickel coins.....	$6.48

The cost of manufacturing coins here is far greater than in Belgium, and has been roughly estimated at the Mint to equal for nickel-alloy coins the cost of material employed. Should this be a correct estimate, the coining would cost here about $73\frac{6}{10}$ cents per pound, or four times as much as the Belgian estimate, which latter is based in part upon the experience of the Mints of other countries as well as its own.

Adding to the cost of material.....	$6.48
An equal sum for cost of working.....	6 48
Would give as total cost of $40 in nickel coins.....	$12.96

which is about $32\frac{4}{10}$ per cent. of their issue value. I do not doubt, however, that the real cost of manufacture will be far below this estimate, especially as much the greater part of the coins are and will be of not less than 5 cent denomination—the smaller ones costing of course proportionally higher. If we allow 40 cents per pound for the manufacture of the coins, which I believe to be adequate, we have:

Cost of material in $40 of coin, $8\frac{88}{100}$ lbs.....	$6.48
Cost of manufacturing $40 of coin, $8\frac{88}{100}$ lbs. @ 40 cts. per lb.	3.52
Showing total cost to be 25 per cent., or for $40.....	$10.00

Assuming that 25 per cent. of the issue value will be the cost price of these coins, and that my estimate of the quantity required by the country is correct, we have the following exhibit of the amount which would be left in the treasury of the Mint by making the coins needed to fill up those estimated totals:

	REQUIRED.	NOW EXISTING.	TO BE MADE.
10 cent coins.....	8,000,000	None.	8,000,000
5 " "	6,000,000	2,200,000	3,800,000
3 & 2ct. "	2,500,000	1,350,000	1,150,000
1 cent "	3,500,000	2,850,000	650,000
Total value to be made.....			$13,600,000
The cost of which being 25 per cent., or.....			3,400,000
Leaves a surplus of.....			$10,200,000

To make the quantity estimated to be needed, would occupy the Mint, with its present facilities, nearly four years; to make the 5, 3 and 1 cent coins only, would occupy it about two years; and it is thus apparent that no near danger exists of over stocking the country.

It will be noticed that less than five years compound interest of the surplus at 6 per cent., equals the entire issue value of these coins; allowing for the value of their material as old metal, at the prices of specie times, those coins which stay out half that time could be redeemed in full by Government without loss, even if they were never subsequently reissued. There would therefore be no risk of loss in now issuing 10 cent coins as proposed, even if it were certain that they would all be returned for redemption within three years. It is, however, tolerably certain that the 10 cent coins, like those of lower denominations, would not come in for redemption, nor be withdrawn by Government to give place to silver coins, but that they would remain permanently in circulation.

Quantity of Nickel required and whence derivable.

Supposing $13,600,000 of coins to be made from an alloy one-fourth of which is nickel, the coins all weighing one gram for 1 cent of denomination, the total weight of the coins would be 1,360,000,000 grams, or 1,360,000 kilograms, of about 2.204 pounds each. This gives 2,997,440 pounds as the total weight of the coins, and 749,360 pounds as the weight of nickel contained in them; adding to this $3\frac{1}{2}$ per cent. for waste in the various operations of coining, we have 775,588 pounds as the total quantity of nickel required.

As this quantity approximates the entire annual production of nickel throughout the world, one is naturally led to enquire whether so much can be taken within four years for the proposed coinage without causing an extravagant increase in the price.

A few years ago no nickel was made in America. The Mint was not able to obtain regularly and at a reasonable price the moderate quantity needed for the cent coin of that time, and thus in the year 1864 abandoned the use of nickel alloy for bronze.

It might then have seemed imprudent to undertake so considerable a coinage of nickel as that now proposed, but even then the resource had begun to exist which is now fully developed.

In the Spring of 1863, while the Mint was feeling the inconvenience of relying upon a foreign supply, I undertook, with the encouragement of the then Director of the Mint, who knew of my having accomplished a somewhat similar task, to establish a home

production of this metal. By making use of the remains of former attempts to produce nickel here, my factory was able to deliver to the Mint before the end of 1863, but too late to reverse the decision in favor of bronze.

This serious disappointment, joined to the dulness of the private demand for nickel by the German-silver makers, the lowness of price caused by an insufficient import duty, and my suspicion that cheaper methods of manufacture were known in Europe, caused me to close the refining works, and operate the mine and smelting works only, the product of which, a concentrated form of ore called Matte, ready to go to the refining works, I sent to Europe for sale.

When the three cent coin was decreed, I sent this Matte to England, receiving in return refined nickel which I sold to the Mint, but at the same time made diligent inquiry through all channels for the best processes and workmen.

As the Mint, and also the private buyers, declared the nickel made by Fleitmann & Witte, of Iserlohn, in Prussia, to be the best, I formed a partnership with the managing partner of that firm, Dr. Theodor Fleitmann; who in the spring of 1866 came to this country and remodelled my refining works, which have since been conducted under his guidance for the account of our firm Wharton & Fleitmann.

The result of the five years toil thus briefly mentioned, and of the outlay of a large amount of money (in the aggregate about $300,000), is as before mentioned, an establishment of mine, smelting works, and refinery, complete in one ownership, producing the best nickel in the world, and second in magnitude to

only one other; that of a wealthy and respectable English firm.

This purely American establishment is able to supply the entire quantity of nickel required for the proposed coins, if allowed a living price, which would be the open market price after the fixing of a tariff upon nickel nearly equal to that on other manufactures, and would not be higher than the price assumed in the foregoing estimates. For six months past, however, the Mint, under newly appointed officers, has bought its entire supply of nickel from England, because offered a few per cent. lower by those manufacturers, who before an American supply existed, did not deliver a sufficient quantity for the cent coin alone, even at a much higher price. Not even the poor option of supplying the Mint at the reduced price of the English, viz.: $1.30 per lb., was allowed to the American establishment.

That policy, originating apparently in a too narrow conception of official duty, would of course, if persisted in, destroy the American establishment, which was erected upon the presumption of the steady support of the Government, and would leave the Mint again to the mercy of the English, who might, or might not supply it. I cannot believe, however, that the Mint will long continue to speculate upon the sacrifices made in good faith for its service, and to virtually collude with foreigners for the destruction of an important American industry, nor that the anomalous position as to import duty now occupied by nickel, because of its having grown to be an American manufacture since the present tariff was made, will long endure. Therefore, I can confidently say that a suffi-

cient supply of nickel may be certainly counted on at a moderate price.

This personal explanation appeared necessary to a frank statement of the case, and it can readily be confirmed by an examination of the Works mentioned, and by written evidence. The Mine and Smelting Works are in Lancaster County, Pa. The Refining Works, which occupy over two acres, are in Camden, N. J.

Conclusion.

I have now endeavored to show:

1. That we have at present a strangely incoherent mass of small change, and that a reform is needed.

2. That token coins not pretending to intrinsic value are the best petty money.

3. That such token coins should be so related to each other as to form a symmetrical system.

4. That they should all be redeemable in legal money of the larger denominations at the pleasure of the holder.

5. That our token coins should be of 10 cents, 5 cents, 3 cents, and 1 cent, and should weigh respectively 10, 5, 3, and 1 grams.

6. That a rich nickel alloy, such as that of 25 parts nickel, 75 parts copper, composing our present 3 cent and 5 cent coins, is the best material.

7. That to supply merely the first stock of these coins would yield a surplus to the Treasury of over $10,000,000, which would practically be so much clear profit, since the coins though redeemable would by the necessities of the public be kept out indefinitely.

8. That the requisite amount of nickel can be produced in this country at a moderate price.

That all United States notes below 25 cents should be withdrawn as soon as possible, needs no showing.

The legislation needed to effect this desirable change is both slight and simple. It is merely necessary to enact that the weight of the 3 cent coins hereafter made shall be 30 grams; that coins of the denominations of 10 cents and 1 cent shall be made, weighing respectively 10 grams and 1 gram, composed of an alloy of copper and nickel, of which not less than 25 per cent. shall be nickel, and that the 5 cent coin and 3 cent coin shall be composed of a similar alloy;* that the old nickel alloy cents shall be exchanged at the Mint for the same nominal value of any of the new nickel coins; that the 10 cent, 5 cent, 3 cent, and 1 cent coins shall bear such devices as to give them a general similarity of appearance; that they shall all be redeemed at the Mint, the Treasury, and each sub-Treasury, when presented in sums of not less than $100 in one parcel; that they shall be legal tender for all sums below $1.00; that no notes of less than 25 cents shall hereafter be issued, except new 10 cent notes in place of a similar number of mutilated notes of the same denomination returned; and that the Secretary of the Treasury shall, when in his opinion compatible with public convenience, forbid the re-issue

* The present laws for the five cent and three cent coin declare that they shall contain "not exceeding" 25 per cent of nickel, the result of which is that they are practically made a little below the intended standard.

of any 10 cent notes received in any Government depository.

The law might also with great propriety ordain that the Director of the Mint shall be authorized, with the approval of the Secretary of the Treasury, to cause small coins of any or all the denominations to be made, in either or both of the Branch Mints at New Orleans and San Francisco; that the materials for the small coins, wherever made, shall be bought by the Director of the Mint,* with the approval of the Secretary of the Treasury; and that those materials shall be so far as practicable of American manufacture.

JOSEPH WHARTON.

PHILADELPHIA, *February*, 1868.

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* The present laws, following those relating to the silver coinage, declare "that the Treasurer of the Mint, under the instruction of the Secretary of the Treasury, shall from time to time purchase from the bullion fund of the Mint the materials necessary for the coinage" of our low coins. This appears to be somewhat inconsistent with the check established by the general theory of the Mint, which supposes supplies to be bought and expenses incurred by the Director, who pays the same by warrants drawn upon the Treasurer.

The calculation of surplus or profit in the foregoing pages supposes the present nickel alloy cent, the present 2 cent and 1 cent bronze coins, and the little remnant of old copper cents to be left in circulation, because to avoid complexity, I preferred to assume in the first instance, that only the amount of cents needed to complete the total required by the country, would be supplied by the new cent coin.

The great number of the old coins causes the withdrawal of them to appear formidable, but it would in reality be much better to recall them at once, by receiving them at the Mint, in exchange for the new cents or other token coins, and thus make the entire system of small coins uniform directly, than to reach that result after long years by the gradual wearing out of the old coins and the gradual issue of the new ones.

As the new cents would be redeemable, and also far more comely and convenient than the old ones, the public would doubtless convert them rapidly enough if allowed to do so.

I will now estimate the cost of immediately replacing the old 1 cent and 2 cent coins by the new cents, assuming that one half of those old coins would be brought in to be so exchanged.

	Grains.
As 1000 coins of 1 gram; 75 parts copper, 25 parts nickel, requires 750 grams of copper, or.....	11,574
And as 183 coins of 72 grains; 88 parts copper, 12 parts nickel, contain of copper.....	11,595

we may consider the copper of 183 old nickel cents to equal the copper of 1000 of the proposed new ones.

	Grains.
As those 183 coins contain 12 per cent. nickel, or	1,581
And the 1000 new cents would contain 250 grams, or	3.858
There would be a deficit in nickel of	2,277
To this add waste in coining, 3½ per cent	80
And the nickel to be bought, is	2.357

This is nearly ⅛ lb., which @ $2.00 per lb., is	$0 67
183 old cents, plus 3½ per cent for waste, cost	1 90
To coin 1000 grams in so small pieces might cost 75 cts. per lb., say 2⅓ lbs. @ 75 cents	1 65
Total cost of making 1000 new cents from old ones.	$4 22

I have estimated the 1 cent and 2 cent coins of all sorts now existing, at $3,600,000.00. The cost of making half that quantity of the new cents, would by this calculation be $759,600.00; allowing that $342,000.00 out of the $675,000.00 old nickel cents returned, would be consumed as material, and charged at their full nominal value. Of the entire $1,800,000.00 taken in, there would then remain on hand $333,000.00 in old nickel cents, $1,000,000.00 in bronze coins, and $125,000.00 in copper.

Counting the bronze to be worth 20 cts. per pound, as old metal, and counting the nickel and copper to be worth as material for the other coins, the prices taken on page 23 in estimating the cost of making those coins, we find those returned coins to be worth as follows:

$333,000. of old nickel cents contain—	
Nickel, 41,102 lbs. at $2 per lb	$82,204 00
Copper, 301,412 lbs. at 28 cents per lb	84,395 36
$1,000,000 of bronze coins contain—	
Bronze 684,930 lbs. at 20 cents per lb	136,986 20
$125,000 of copper coins contain—	
Copper, 300,000 lbs. at 28 cents	84.000 00
Total value of old material	$387,585 56

The conversion would thus require the taking in at par, of old coins nominally worth		$1,800,000 00
The cost of an equal nominal value of new cents has been shown to be		759,600 00
Total debit		$2,559,600 00
Deduct issue value of new cents	$1,800,000 00	
Value of surplus old material	387,585 56	
Old cents used, charged at par	342,000 00	
		2,529,585 56
Net loss by the exchange		$30,014 44

In case the weight of the new cents should be fixed at $1\frac{1}{2}$ grams, this net loss would approach $200,000.

This would slightly reduce the total net surplus to be derived from the first issue of the entire system of proposed token coins, but it would surely be highly desirable to make the system complete at once, by thus sweeping away the unconformable old 1 cent and 2 cent pieces.

If grain weights should be preferred to grams, the 3 cent coin is now what it should be, viz., 30 grains; the 5 cent coin would be reduced to 50 grains, retaining perhaps its present diameter; the 10 cent coin would be 100 grains; and the 1 cent coin might be 20 grains.

These weights would all be suitable and commodious; the entire system would be a good one; and the surplus derived from it would be about $850,000 larger than from the gram system proposed, because the total weight would be about 756,000 pounds less.

ERRATUM.

On eighth line of page 29, for 30 grams, read 3 grams.

APPENDIX.

The following is a translation of the Belgian small coin law adopted by the Senate in the session of June 28, 1860, by a vote of 35 to 7, 5 members not voting:

ART. 1. Petty coins shall be made of a metal composed of nickel and copper. This alloy shall contain at least 25 per cent. of nickel.

ART. 2. The nickel coins shall be of five centimes, ten centimes, and twenty centimes.

ART. 3. The minimum weight of these pieces is fixed as follows:

For the piece of 5 centimes, 2 grammes.
" " 10 " 4 "
" " 20 " 6 "

ART. 4. The diameter of each of the pieces shall be fixed by royal decree.

ART. 5. The tolerance of weight both above and below shall be

For the pieces of 5 centimes, 15 thousandths.
" " 10 " 13 "
" " 20 " 10 "

ART. 6. The design of the nickel coins shall be regulated by royal decree.

ART. 7. No person is obliged to receive in payment more than five francs in nickel coins, nor more than two francs in copper coins.

Government will authorize, so far as possible, the receipt of them into the national treasury in larger sums in payment of taxes.

ART. 8. The nickel coins shall be exchanged for large money (*monnaies de payement*) in sums, the minimum of which shall be fixed by Government, and in the offices which it shall designate.

The public shall be allowed to exchange large money for petty money in the offices and upon the conditions to be determined by Government.

ART. 9. Government will fix the date when the five centime and ten centime pieces of copper, as well as the twenty centime pieces of silver shall cease to have legal circulation.

A period of at least three months shall be granted for the exchange of these pieces in the national treasuries.

ART. 10. At the date fixed for the execution of the preceding articles, articles 12, 13, 17, 18, 23 and 24 of the monetary laws of June 5, 1832, as well as articles 2 and 3 of the law of December 1, 1852, shall be abrogated, so far as relates to the manufacture and legal circulation of the copper pieces of five and ten centimes, and the silver pieces of twenty centimes.